I. Introduction

We used SpotFire to visualize NBA statistics made available by databaseBasketball.com [1]. This dataset includes yearly statistics measuring players’ performances, as well as general information on each player.

II. Headlines

Figure 1: Three-point and field goal shooting percentages over time

1. Field goal shooting percentage steadily decreased until 2001

Figure 1 shows that following 1985, performance in field goal shooting steadily decreased until the early 2000s. After 2001, field goal shooting improved significantly, especially among centers.

Prior to 2001, the NBA had banned zone defenses via the illegal defense rule introduced in 1978 [2]. In
the 2001-2002 season, the NBA lifted all restrictions against zone defenses, and instead introduced the Defensive Three-Second Rule, which stops defenders from sitting in the lane [2]. It seems that instead of making it harder on offenses, this allowed them to score more from the paint.

The likely explanation is that the illegal defense rule was vague, which allowed teams to take advantage of it [4]. As it happens, the 1981-1982 season marks the year in zone defense rules were “clarified” [2], shortly after which the decline in shooting began. Teams constantly improved at this until a better-defined rule allowed offenses to work near the basket more efficiently.

2a. Three-point shooting percentage has steadily increased

During the years that field goal percentage declined, the average three-point shot percentage increased steadily. This is true mainly among guards and forwards, who take most of the three-pointers. It is more difficult to explain than the change in field goal shooting. One possibility is that it is a response; teams focused on utilizing players who could shoot accurately from the three-point line to make up for the difficulty in shooting field goals. Alternatively, better training could be responsible.

From 1994 to 1996, three-point success spiked for all three positions. This coincides with the NBA’s decision in the 1994-1995 season to shorten the three-point line by almost two feet. After multiple record-setting three-point shooting performances, the NBA restored the original distance for the 1997-1998 season, causing three-point percentage to drop back down.

![Figure 3: Number of three point attempts per position over time](image-url)
2b. Forwards take more three-point shots than before

It is common to think that three point shooting is mostly the Guards’ job. As we can see in Figure 3, in the late 70s, when three pointers were first introduced to the NBA, this was indeed the case. Guards took about three quarters of these shots.

Over time, it seems that Forwards take a higher percentage of the three point shots. In the past few years it has reached the point where Forwards take more than one third of the three point shots.

One explanation for this phenomenon is that players’ abilities have become more versatile as the game evolves, and that Forwards take on more responsibilities than in their “classic” role. This trend may be related to the increase in three-point accuracy, but it is difficult to show this using this data alone.

3. Experience matters early on, but “veteran” players were stars in the first place

Announcers often refer to “veteran” players. As players gain experience in the NBA, we expect them to mature and show improvement in certain non-physical skills, such as execution and “Basketball IQ.” Figure 2 suggests that for the most part, it is ability that makes a player a veteran, and not the other way around.

One measure of skill for point guards is Assists Per Turnover, the ratio of the number of successful
passes to unsuccessful passes. Figure 2 shows how this statistic changes with experience, both in terms of age and years spent playing in the NBA, in the regular season and playoffs.

Each plot suggests that players improve quickly in their first several years, after which their performances level off. Also noticeable in Figure 2 is the spike at far right of each plot, during which the average performance seems to increase again. Selecting this region, we see that many of the players are standout point guards: Gary Payton, John Stockton, and Magic Johnson, among others, each of whom Fox Sports lists as belonging to the top 10 point guards in NBA history [5]. The players who can still play in the NBA after 14 years are the ones who excelled during their earlier careers.

III. Evaluation of spotfire

Spotfire is a powerful tool for visual analysis, and we liked the flexibility that it provides to structure the data in many ways. This encouraged us to think about the data in complex ways by allowing us to experiment with structures to view multi-dimensional data in, and to choose those which we found most intuitive. At the same time, when we started with an initial idea of what we wanted that structure to be, accomplishing it could be difficult. This is probably because of the higher investment of using a more complex tool, and after one week of using it we certainly improved.

One possible improvement would be to allow the user to filter by page, not by dataset. When creating two side-by-side visualizations, we would have appreciated if Spotfire had allowed us to filter our dataset differently for each visualization, instead of requiring a second copy of the dataset.

We found that the parallel coordinate view was useful for exploring the data to discover trends. Once we discovered an interesting trend, however, we thought that a standard scatter or line plot displayed that trend more effectively.

References


[4] Subtly, Zone Defense Helps Open Game,
http://www.nytimes.com/2009/02/28/sports/basketball/28zone.html?_r=0

[5] Top 10 point guards in NBA history,